Memorandum

To: Tom Bakaly, City Manager

From: Judy Dorsey and Shelby Sommer

CC: Kristi Morris, Shelli Margolin-Mayer, Pamela Townsend, Ken Robertson

Date: February 3, 2015

Re: Economic Benefits of Carbon Neutrality Follow-Up Response to City Council Questions

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This memorandum provides a response to questions and comments raised during the November 5, 2014 Adjourned Regular Meeting of the Hermosa Beach City Council. Under Agenda Item 6: Municipal Matters, consultant Judy Dorsey of Brendle Group presented the findings of a memorandum focused on the potential economic benefits of carbon neutrality, including the potential of a "first-to achieve" position. A summary of City Council questions and comments is provided below.

- Explain the potential role of the City in implementing community carbon neutrality.
- Present the costs and savings in a way that shows the direct investment needed by and benefits to the City organization.
- Further define and quantify the health and other indirect benefits of reduced emissions.
- Expand the process to allow for greater exploration of the potential benefits of carbon neutrality investment from a range of community stakeholders.

The remainder of this memorandum provides additional detail in response to each of these requests.

City Role in Community Carbon Neutrality

The City of Hermosa Beach's specific role in supporting the achievement of community-wide carbon neutrality is somewhat flexible, and depends on the interests and level of risk, commitment, and investment desired by its leaders. However, some potential roles for consideration include the following:

- **Leadership by example**: the City of Hermosa Beach has the opportunity to continue to provide leadership by pushing to achieve carbon neutrality in its municipal operations ahead of the entire community. This could be achieved through continued investments into renewable energy sources, building retrofits, fleet upgrades, employee training and engagement, and coordination with utility providers.

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- **Community Convener:** in addition to leading by example in municipal operations, the City of Hermosa Beach can play a major role in bringing together residents, businesses, organizations, and investors to initiate and sustain conversations about how to reduce emissions in the private sector.
- **Social Mobilization:** the City of Hermosa Beach can also offer education and incentives to encourage behavior change and investments among residents and businesses to climate mitigation strategies to scale community-wide. This includes a communication and outreach campaign as well as training seminars for contractors and suppliers
- **Cost Share and Program Funding:** providing financial incentives to residents and businesses is one way that the City of Hermosa can support and invest in community carbon neutrality. Other investment opportunities might include pursing partnerships with outside investors on infrastructure projects. In order to achieve carbon neutrality, it is likely that the City will also need to invest in the purchase of carbon offsets, either through direct purchases by the municipality or by initiating and leading a strategy for those costs to be shared in some way.

City Investment and Benefits

In order to fully determine the level of investment necessary by the City of Hermosa Beach to achieve carbon neutrality, more detailed economic modeling is needed, as is a more defined goal and pathway for getting there. However, it is clear that regardless of the goal and pathway selected, the City of Hermosa Beach cannot invest in and achieve community carbon neutrality alone. With an annual budget of approximately $34 million, the City of Hermosa Beach cannot simply "purchase" neutrality, unless it wants to achieve it through purchase of offsets. Instead, the investment would need to involve the City, as well as its residents, businesses, and private investors.

In terms of who would pay for what, the City of Hermosa Beach is most likely to bear the responsibility for a large portion of costs associated with any major public infrastructure projects to support carbon neutrality (e.g., transportation or transit improvements, which might also be funded with regional, state, or federal dollars). Likewise, the City of Hermosa Beach will likely be responsible for purchasing or leading efforts to purchase carbon offsets. For both of these items, it would be necessary to determine if there is any interest in the community for additional fees or taxes to support these types of public investment.

Investments in energy efficiency and renewable energy would likely require a combination of publicly-funded incentives and direct installations, plus investments from individual residents and businesses and outside investors. Perhaps the largest opportunities for contributions from sponsors would be in these two arenas – efficiency and renewables. This is because of the potential benefits associated with them from high visibility and exposure across the community. A summary of some potential options for financing the community's carbon neutrality efforts are provided below.

Local Government	Individuals & Businesses	Others
• Bonds • Tax increment financing • Consumer grants, loans, and direct installs • Community Choice Aggregation	• Self-funded • Mortgage/Home equity • Traditional bank loans or consumer lending • Energy efficiency loans • Property Accessed Clean Energy (PACE) Programs • On-bill tariffs or financing	• Sponsorships and donations • User fees and revenue • Regional, State and Federal grants • Development exactions

Direct savings to the City of Hermosa Beach from achieving community carbon neutrality would most likely come in the form of savings from reduced energy and fuel expenses among municipal facilities and fleets. It is important to note that most of the direct savings from reductions in utility bills from efficiency improvements and renewable energy generation would be realized by the bill payers themselves. Those savings could result in additional disposable income, which could in turn indirectly benefit the City's sales tax revenue.

In terms of property taxes, high-performance and energy efficient buildings are shown to sell for more than comparable non-efficient buildings, which could lead to increased property assessments and tax revenue for the City. Other potential direct benefits might include reduced maintenance costs on roads from reduced vehicle use and potentially reductions in waste expenses. Further benefits to the City of Hermosa Beach from an investment in community carbon neutrality are described in the following section.

Other Benefits: Health Savings, Jobs

In addition to direct savings from reduced energy and fuel expenses, other benefits resulting from community carbon neutrality would likely include cost savings from reduced health care expenses and the creation of jobs based on the implementation strategies selected.

Investments to reduce carbon emissions from the transportation sector are most likely to benefit the health of Hermosa Beach residents. In particular, reductions in overall vehicle miles traveled by Hermosa Beach motorists will likely mean shifts to other, more active modes of transportation, such as walking, bicycling, or even walking to a transit stop. One study shows that there is an estimated $0.069 health care cost associated for each vehicle mile traveled using a light gas vehicle.[1] We apply this assumption to the estimated reduction in Hermosa Beach's vehicle miles traveled to estimate the total health care costs savings each year.

Note that additional health benefits and cost savings are likely to emerge due beyond those associated with vehicle miles traveled; however, the benefits of these strategies are likely to be realized across the greater metropolitan region, not directly by Hermosa Beach residents. Our methodology presents an estimate of the directly quantifiable potential health cost savings to households within the City due to investments in community transportation infrastructure. In contrast, other studies show much greater potential for savings from investments into transportation and clean energy. For example, research has shown that it is possible to recoup an estimated 26 percent of transportation investments in vehicle miles travel reductions and increased efficiency and fuel economy through avoided health care costs.[2] Furthermore, the U.S. Environmental Protection Agency's proposed Clean Power Plan states that these climate and health benefits far outweigh the estimated annual costs of the plan" and the report goes on

[1] Transportation Cost and Benefit Analysis II - Air Pollution Costs, Mar 16, 2011, Victoria Transport Policy Institute.
[2] Tammy M. Thompson,Sebastian Rausch, Rebecca K. Saari & Noelle E. Selin, Nature Climate Change 4, 917–923 (2014) doi:10.1038/nclimate2342 Received 28 January 2014 Accepted 21 July 2014 Published online 24 August 2014.

to estimate that "for every dollar invested through the Clean Power Plan, American families will see up to $7 in health benefits."[3]

To estimate the number of jobs that carbon neutrality could create for the City of Hermosa Beach, we look to several different reports. First, per estimates from the California Clean Energy Commission, demand-side management is estimated to create 1 job-year per $56,500 to $39,700 of direct investment of utilities into energy efficiency project and programs.[4] A more conservative estimate is identified by Rocky Mountain Institute – approximately 6.3 FTE job-years created per $1 million investment in efficiency measures.[5] Our estimate of jobs created from investment into energy efficiency measures is based on this value.

In terms of jobs created from investment into renewable energy, California Energy Commission's 2012 analysis based on NREL's JEDI Model, estimates that there are 11.19 job-years created per Megawatt average (MWa) for solar photovoltaic residential systems less than one MW, and 8.25 job-years per MWa for large commercial.

Similar to our methodology to estimate directly quantifiable health cost savings through reductions in vehicle miles traveled, our methodology to estimate jobs created is based on direct investments into energy efficiency improvements and renewable energy installation within the City of Hermosa Beach. Our methodology does not include the potential jobs created from reductions in transportation or waste-related emissions because of the wide variations in potential strategies to achieve those necessary reductions (e.g., the number of jobs created to enhance transit service would be quite different from the number of jobs created through a bicycle lane improvement project). For this reason, our estimated number of jobs created is conservative, and wide ranges are likely depending on the strategies selected to achieve neutrality, including the land use and transportation choices under consideration through the Hermosa Beach General Plan Update process.

The table on the following page provides a summary of two different pathways to achieving community carbon neutrality. Pathway A represents the "null alternative" wherein the City of Hermosa Beach achieves neutrality simply through the purchase of carbon offsets. While this is not a recommended pathway, it is helpful to bracket the full range of potential costs and savings with this scenario.

Pathway B includes strategies ranging from moderate to aggressive implementation of measures such as energy efficiency improvements, distributed renewables, vehicle miles traveled reductions, adoption of more efficient vehicles and purchases of offsets and Green Rate electricity. The range of estimated costs and savings includes the potential pathway outlined in the October 30, 2014 memo from Brendle Group to the City Council. This is just one illustrative range of options for the community to achieve neutrality for high-level economic analysis purposes, and should not be interpreted as a recommendation. Reductions achieved through offset and Green Rate purchases ranges from 20 percent to 50 percent in the Pathway B scenarios.

[3] U.S. EPA Fact Sheet: Why We Need a Cleaner, More Efficient Power Sector. http://www2.epa.gov/carbon-pollution-standards/fact-sheet-clean-power-plan-benefits. Accessed February 2, 2015.
[4] California Clean Energy Commission Preliminary Estimates of Job Creation (2012),
[5] RMI, 2014. Stepping Up: Benefits and Cost of Accelerating Fort Collins' Energy and Climate Goals.

	Pathway A	Pathway B
Pathway Summary	Purchase offsets for 100% of emissions (null alternative for illustration/bracketing).	Moderate to aggressive implementation of various strategies (including the pathway described in the October 30 memo).
Target Year	2030	2030
Emissions Reduction Required (MT CO2e)	134,000	134,000
One-Time Community Investment to Achieve Goal[6]	n/a	$103 – 155M
Community Offset and Green Rate Purchases	$2 – 3M/yr[7]	$1 – 3M/yr
Community Cost Savings from Achieving Goal	$0/yr	$31 – 63M/yr
Additional Community Health Cost Savings[8]	$0/yr	$1.9 – 4.8M/yr
Jobs Created (job-years)	0	800 – 1,000
Per Household Normalization		
Total Cost per Household[9]	$200 - 300/yr	$1,000 – 1,200/yr
General Cost Savings per Household[10]	$0/yr	$2,500 – 6,500/yr
Additional Health Cost Savings per Household[11]	$0/yr	$200 –500/yr
Total (Costs) Savings per Household	($200-300/yr)	$1,700 – 5,800/yr

[6] Estimated one-time investment is the estimated size of the program to be financed in partnership with the City of Hermosa Beach, homeowners, business, contractors, developers, utilities, transportation agencies, federal/state agencies, grants, and other organizations and foundations.
[7] The total offset and Green Rate purchase costs depend on the mix of offsets, assumed at $15 per ton, and electricity purchases under the Green Rate premium of $0.07 per kilowatt hour.
[8] Note that the estimated health cost savings are calculated using estimated reductions in vehicle miles traveled – a defensible estimate of all of the potential savings.
[9] Note that the cost per household is estimated by dividing the total community costs by the total number of households. As described in the City Investment and Benefits section, the proportion of investment by the City, residents, businesses, and others has yet to be determined; yet it is unlikely that households will bear the full costs of implementation.
[10] Cost savings per household is estimated by dividing the total community savings by the total number of households. It is unlikely that households will reap the full benefits of the total cost savings; these savings are also likely to be shared by businesses and investors.
[11] Health cost savings per household is estimated by dividing the total community health cost savings by the total number of households. It is unlikely that households will reap the full benefits of the total health cost savings; these savings are also likely to be shared by businesses and investors.

More Inclusive and Robust Process

In order to facilitate a more inclusive process around the topic of community carbon neutrality, it is proposed that economic analysis efforts be aligned with the current General Plan update process. Both efforts are exploring options for reduced carbon emissions across the community, including land use and transportation decisions that will have direct impacts on emissions. As a result, it will be most effective to explore questions such as the pathway to community carbon neutrality, the potential direct and indirect benefits, and who pays and who saves as part of the larger dialogue around the community's desired future via the General Plan update process. As well as being more inclusive and aligning with the community's desired future, advancing carbon neutrality also requires a more robust techno-economic analysis in the next phase tied to increasing specificity on the strategies, tactics, and near-term policies to achieve neutrality. While the results from Phase I are directionally correct, the methodology was limited to an order of magnitude estimate based on available data and plans.

The following outline summarizes the proposed scope of work to expand the economic analysis process to allow for greater exploration of the potential benefits of carbon neutrality investment from a range of community stakeholders:

- Task 1. Stakeholder Engagement
    - Explore the topic of carbon neutrality with the General Plan Working Group, Technical Advisory Committee, and a focus group of other local and regional climate experts and carbon neutrality advocates.
- Task 2. Tool Coordination and Strategy Evaluation
    - Convert the existing analysis spreadsheets into a user-friendly tool, in coordination with Raimi + Associates.
    - Refine the land use and transportation analysis and update the modeling tool with the latest GHG inventory documentation.
    - Update the analysis to refine the costs and benefits analysis presented in November to include additional stakeholder input and refine the presentation to include the range of costs and benefits based under different pathways to accomplish neutrality.
- Task 3. Carbon Neutrality Commitment
    - Develop and presentation of a recommendation for a refined City carbon neutrality target and scenarios for achieving neutrality.
- Task 4. Budgeting and Action Plan
    - Develop an action plan that identifies priority near-term strategies to achieve the carbon neutrality target.
    - Recommendation of draft policies, potential programs, and other longer-term implementation strategies to be incorporated into the updated General Plan.